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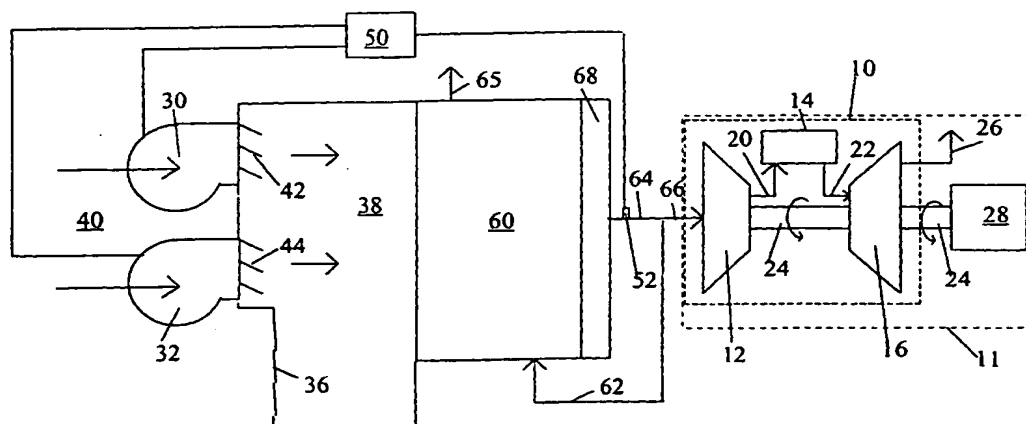
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(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
4 January 2001 (04.01.2001)

PCT

(10) International Publication Number
WO 01/00975 A1

- (51) International Patent Classification⁷: F02C 1/00, [US/US]; 8705 Cromwell Drive, Springfield, VA 22151 (US).
9/00, E03B 7/10
- (21) International Application Number: PCT/US00/15821 (74) Agents: DELUCA, Vincent, M. et al.; Rothwell, Figg, Ernst & Manbeck, Suite 701 East, Columbia Square, 555 13th Street N.W., Washington, DC 20004 (US).
- (22) International Filing Date: 9 June 2000 (09.06.2000)
- (25) Filing Language: English (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (26) Publication Language: English (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (30) Priority Data:
60/138,848 10 June 1999 (10.06.1999) US
60/139,894 22 June 1999 (22.06.1999) US
09/388,927 2 September 1999 (02.09.1999) US
60/152,277 3 September 1999 (03.09.1999) US
60/159,207 13 October 1999 (13.10.1999) US
09/475,154 30 December 1999 (30.12.1999) US
60/195,302 10 April 2000 (10.04.2000) US
- (63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 09/475,154 (CIP)
Filed on 30 December 1999 (30.12.1999)
- (71) Applicant (for all designated States except US): WORK SMART ENERGY ENTERPRISES, INC. [US/US]; 2948 Macomb Street, N.W., Washington, DC 20008 (US).
- (72) Inventor; and
(75) Inventor/Applicant (for US only): KOPKO, William, L.
- Published:
— With international search report.
— Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
- (54) Title: SUPERCHARGING SYSTEM FOR GAS TURBINES



(57) Abstract: A supercharging system for gas turbine power plants (11). The system includes a supercharging fan (30, 32) and a controller (50) for limiting turbine power output to prevent overload of the generator (28) at lower ambient temperatures. The controller can limit power output by burner control, inlet temperature control, control of supercharging fan pressure and other options. The system can be retrofit on an existing turbine without replacing the generator and associated parts.

WO 01/00975 A1

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 27 AUG 2001

WIPO PCT

Applicant's or agent's file reference 2297-111.PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/15821	International filing date (day/month/year) 09 JUNE 2000	Priority date (day/month/year) 10 JUNE 1999
International Patent Classification (IPC) or national classification and IPC IPC(7): F02C 01/00, 09/00; E05B 7/10 and US Cl.: 60/39.03, 728; 138/39		RECEIVED
Applicant WORK SMART ENERGY ENTERPRISES, INC.		JUN 17 2003 TECHNOLOGY CENTER R3700

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 03 JANUARY 2001	Date of completion of this report 06 JULY 2001
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer <i>Charles Freay</i> CHARLES FREAY
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0639

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/15821

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)	Claims	(Please See supplemental sheet)	YES
	Claims	(Please See supplemental sheet)	NO
Inventive Step (IS)	Claims	(Please See supplemental sheet)	YES
	Claims	(Please See supplemental sheet)	NO
Industrial Applicability (IA)	Claims	(Please See supplemental sheet)	YES
	Claims	(Please See supplemental sheet)	NO

2. citations and explanations (Rule 70.7)

Claims 77-80 lack novelty under PCT Article 33(2) as being anticipated by KOLP et al.

Kolp et al discloses a gas turbine power plant (see Fig. 12) having a gas turbine driving a generator and having first and second foggers located upstream of the gas turbine.

Claims 76, 77 and 79 are novelty under PCT Article 33(2) as being anticipated by Munk.

Munk discloses a gas turbine power plant (110, 120, 150) having a supercharger (160) connected to a duct (115) which has foggers (250) located therein.

Claims 1-5, 8, 9, 11, 15-17, 19-21, 23-30, 33, 34, 36, 39-42, 44, 48 and 49 lack an inventive step under PCT Article 33(3) as being obvious over the FOSTER-PEGG article (hereafter FOSTER-PEGG) "Supercharging of Gas Turbines by Forced Draft Fans with Evaporative Intercooling".

FOSTER-PEGG discloses a retrofit supercharger for a gas turbine power plant having an evaporative cooler. It also discusses that it is common when designing a power plant to match the gas turbine power output to the required load needed to drive a generator (see page 4 column 2). FOSTER-PEGG also teaches that a supercharger and evaporative cooling can be used to compensate for any power losses that occur when the power plant is operated in high temperature (i.e. off design) conditions. FOSTER-PEGG does not disclose that a controller is used which limits the supercharger output so that power plant output does not exceed its maximum unsupercharged design output. Nor does FOSTER-PEGG disclose that the power is specifically controlled by regulating either the supercharger speed or the evaporative cooler. At the time of the invention it would have been obvious to control or limit the supercharging effect so that it does not result in a power plant output which is greater than the maximum unsupercharged design output. Firstly, the examiner notes that the skill level of one of ordinary skill in the gas turbine power plant art is high. Often requiring masters or doctoral degrees. (Continued on Supplemental Sheet.)

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 11

systems in order to control the power output of the gas turbine.

Claims 1-5, 8, 11-13, 15-17, 19-30, 32, 33, 34, 36-38, 40-42, 44, 48, 49, 60, 62-73 and 75 lack an inventive step under PCT Article 33(3) as being obvious over FOSTER-PEGG.

FOSTER-PEGG discloses a supercharger for a gas turbine power plant having an evaporative cooler. It is commonly understood that when designing a power plant the gas turbine power output must be matched to the required load needed to drive a generator. FOSTER-PEGG does not disclose that a controller is used which limits the supercharger output so that power plant output does not exceed its maximum unsupercharged design output. Nor does FOSTER-PEGG disclose that the power is specifically controlled by regulating either the supercharger speed or the evaporative cooler. At the time of the invention it would have been obvious to control or limit the supercharging effect so that it does not result in a power plant output which is greater than the maximum drive loads of the generator. Firstly, the examiner notes that the skill level of one of ordinary skill in the gas turbine power plant art is high. Often requiring masters or doctoral degrees. Secondly, as noted above when originally designing the power plant care must be taken to correctly match the gas turbine power output to the required load for the generator. Therefore, when retrofitting such a system it would have been obvious to a skilled artisan to note those design conditions as the already set forth maximums and to control the supercharging which is done at off design conditions so that these maximum power outputs are not exceeded. Thus resulting in a system which not only meets the power demands over a greater range of operating conditions but also prevents any damage to the driven device. The examiner also gives official notice that it is well known to control supercharger pressure by controlling fan speed and to control evaporative cooling power increases by controlling the cooling system. Thus it would have been obvious to a skilled artisan to control either of these systems in order to control the power output of the gas turbine. It also would have been obvious to a skilled artisan to use plural of the supercharging fans in various arrangements in order to multiply the supercharging effect.

Claims 6, 7, 10, 18, 31, 35, 43, 50-59, 61 and 74 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a gas turbine power plant having a supercharged and a controller wherein the system comprises two or more superchargers pressurizing a plenum from which the gas turbine draws its airstream, the plenum having a bypass damper, or wherein there is a cooler and a secondary airstream is drawn from the gas turbine input airstream and passed back through the cooler to enhance cooling performance of the cooler. Further the prior art does not teach of a duct for conveying a high-pressure fluid, the duct comprising an interior conduit within an exterior conduit, the interior conduit having a polygonal cross-section and the exterior conduit having an arcuate cross-section, the conduits defining a space there between and the interior conduit having a flow passage in a wall thereof to provide fluid communication and equalize pressure between the interior of the interior conduit and the space.

----- NEW CITATIONS -----

NONE

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

DELUCA, Vincent, M.
Rothwell, Figg, Ernst & Manbeck
Suite 701 East
Columbia Square
555 13th Street N.W.
Washington, DC 20004
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 22 November 2001 (22.11.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 2297-111.PCT	
International application No. PCT/US00/15821	International filing date (day/month/year) 09 June 2000 (09.06.00)

1. The following indications appeared on record concerning:									
<input checked="" type="checkbox"/> the applicant	<input type="checkbox"/> the inventor								
<input type="checkbox"/> the agent	<input type="checkbox"/> the common representative								
Name and Address ENHANCED TURBINE OUTPUT, LLC 3000 Connecticut Avenue, N.W. Washington, DC 20008 United States of America	<table border="1"> <tr> <td>State of Nationality US</td> <td>State of Residence US</td> </tr> <tr> <td colspan="2">Telephone No.</td> </tr> <tr> <td colspan="2">Facsimile No.</td> </tr> <tr> <td colspan="2">Teleprinter No.</td> </tr> </table>	State of Nationality US	State of Residence US	Telephone No.		Facsimile No.		Teleprinter No.	
State of Nationality US	State of Residence US								
Telephone No.									
Facsimile No.									
Teleprinter No.									
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:									
<input type="checkbox"/> the person	<input checked="" type="checkbox"/> the name								
<input type="checkbox"/> the address	<input type="checkbox"/> the nationality								
<input type="checkbox"/> the residence									
Name and Address ENHANCED TURBINE OUTPUT HOLDING, LLC 3000 Connecticut Avenue, N.W. Washington, DC 20008 United States of America	<table border="1"> <tr> <td>State of Nationality US</td> <td>State of Residence US</td> </tr> <tr> <td colspan="2">Telephone No.</td> </tr> <tr> <td colspan="2">Facsimile No.</td> </tr> <tr> <td colspan="2">Teleprinter No.</td> </tr> </table>	State of Nationality US	State of Residence US	Telephone No.		Facsimile No.		Teleprinter No.	
State of Nationality US	State of Residence US								
Telephone No.									
Facsimile No.									
Teleprinter No.									
3. Further observations, if necessary:									
4. A copy of this notification has been sent to:									
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned								
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned								
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:								

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Beate GIFFO-SCHMITT Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

14
REC'D 27 AUG 2001

WIPO PCT

Applicant's or agent's file reference 2297-111.PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/15821	International filing date (day/month/year) 09 JUNE 2000	Priority date (day/month/year) 10 JUNE 1999
International Patent Classification (IPC) or national classification and IPC IPC(7): F02C 01/00, 09/00; E05B 7/10 and US Cl.: 60/39.03, 728; 138/39		
Applicant WORK SMART ENERGY ENTERPRISES, INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 03 JANUARY 2001	Date of completion of this report 06 JULY 2001
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer <i>J. Hurley For</i> CHARLES FREAY
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0639

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/15821

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed☒ the description:

pages 1-42 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the claims:

pages 43-59 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the drawings:

pages 1-18 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the sequence listing part of the description:

pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

☒ the description, pages NONE
☒ the claims, Nos. NONE
☒ the drawings, sheets/fig NONE

5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/15821

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)	Claims	<u>(Please See supplemental sheet)</u>	YES
	Claims	<u>(Please See supplemental sheet)</u>	NO
Inventive Step (IS)	Claims	<u>(Please See supplemental sheet)</u>	YES
	Claims	<u>(Please See supplemental sheet)</u>	NO
Industrial Applicability (IA)	Claims	<u>(Please See supplemental sheet)</u>	YES
	Claims	<u>(Please See supplemental sheet)</u>	NO

2. citations and explanations (Rule 70.7)

Claims 77-80 lack novelty under PCT Article 33(2) as being anticipated by KOLP et al.

Kolp et al discloses a gas turbine power plant (see Fig. 12) having a gas turbine driving a generator and having first and second foggers located upstream of the gas turbine.

Claims 76, 77 and 79 are novelty under PCT Article 33(2) as being anticipated by Munk.

Munk discloses a gas turbine power plant (110, 120, 150) having a supercharger (160) connected to a duct (115) which has foggers (250) located therein.

Claims 1-5, 8, 9, 11, 15-17, 19-21, 23-30, 33, 34, 36, 39-42, 44, 48 and 49 lack an inventive step under PCT Article 33(3) as being obvious over the FOSTER-PEGG article (hereafter FOSTER-PEGG) "Supercharging of Gas Turbines by Forced Draft Fans with Evaporative Intercooling".

FOSTER-PEGG discloses a retrofit supercharger for a gas turbine power plant having an evaporative cooler. It also discusses that it is common when designing a power plant to match the gas turbine power output to the required load needed to drive a generator (see page 4 column 2). FOSTER-PEGG also teaches that a supercharger and evaporative cooling can be used to compensate for any power losses that occur when the power plant is operated in high temperature (i.e. off design) conditions. FOSTER-PEGG does not disclose that a controller is used which limits the supercharger output so that power plant output does not exceed its maximum unsupercharged design output. Nor does FOSTER-PEGG disclose that the power is specifically controlled by regulating either the supercharger speed or the evaporative cooler. At the time of the invention it would have been obvious to control or limit the supercharging effect so that it does not result in a power plant output which is greater than the maximum unsupercharged design output. Firstly, the examiner notes that the skill level of one of ordinary skill in the gas turbine power plant art is high. Often requiring masters or doctoral degrees. (Continued on Supplemental Sheet.)

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

V. 1. REASONED STATEMENTS:

The report as to Novelty was positive (YES) with respect to claims 1-58, 60-75 and 81.

The report as to Novelty was negative (NO) with respect to claims 59 and 76-80.

The report as to Inventive Step was positive (YES) with respect to claims 6,7,10,18,31,35,43,50-59,61 and 74.

The report as to Inventive Step was negative (NO) with respect to claims 1-5,8,9,11-17,19-30,32-34,36-42,44-49,60,62-73 and 75-81.

The report as to Industrial Applicability was positive (YES) with respect to claims 1-81.

The report as to Industrial Applicability was negative (NO) with respect to claims NONE.

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

Secondly, it is noted that FOSTER-PEGG recognizes that when originally designing the power plant care must be taken to correctly match the gas turbine power output to the required load for the generator. Therefore, when retrofitting such a system it would have been obvious to a skilled artisan to note those design conditions as the already set forth maximums and to control the supercharging which is done at off design conditions so that these maximum power outputs are not exceeded. Thus resulting in a system which not only meets the power demands over a greater range of operating conditions but also prevents any damage to the driven device. The examiner also gives official notice that it is well known to control supercharger pressure by controlling fan speed and to control evaporative cooling power increases by controlling the cooling system. Thus it would have been obvious to a skilled artisan to control either of these systems in order to control the power output of the gas turbine.

Claims 1-5, 8, 9, 11, 14-17, 19-30, 33, 34, 36, 40-42, 44, 48, 49 and 81 lack an inventive step under PCT Article 33(3) as being obvious over KOLP et al.

KOLP et al discloses a supercharger for a gas turbine power plant having an evaporative cooler. It is commonly understood that when designing a power plant the gas turbine power output must be matched to the required load needed to drive a generator. KOLP et al does not disclose that a controller is used which limits the supercharger output so that power plant output does not exceed its maximum unsupercharged design output. Nor does KOLP et al disclose that the power is specifically controlled by regulating either the supercharger speed or the evaporative cooler. At the time of the invention it would have been obvious to control or limit the supercharging effect so that it does not result in a power plant output which is greater than the maximum drive loads of the generator. Firstly, the examiner notes that the skill level of one of ordinary skill in the gas turbine power plant art is high. Often requiring masters or doctoral degrees. Secondly, as noted above when originally designing the power plant care must be taken to correctly match the gas turbine power output to the required load for the generator. Therefore, when retrofitting such a system it would have been obvious to a skilled artisan to note those design conditions as the already set forth maximums and to control the supercharging which is done at off design conditions so that these maximum power outputs are not exceeded. Thus resulting in a system which not only meets the power demands over a greater range of operating conditions but also prevents any damage to the driven device. The examiner also gives official notice that it is well known to control supercharger pressure by controlling fan speed and to control evaporative cooling power increases by controlling the cooling system. Thus it would have been obvious to a skilled artisan to control either of these systems in order to control the power output of the gas turbine.

Claims 1-5, 8, 9, 11, 15-17, 19, 21-30, 33, 34, 36, 40-42, 44-47, 49 and 81 lack an inventive step under PCT Article 33(3) as being obvious over MUNK.

MUNK discloses a supercharger for a gas turbine power plant having an evaporative cooler. It is commonly understood that when designing a power plant the gas turbine power output must be matched to the required load needed to drive a generator. MUNK does not disclose that a controller is used which limits the supercharger output so that power plant output does not exceed its maximum unsupercharged design output. Nor does MUNK disclose that the power is specifically controlled by regulating either the supercharger speed or the evaporative cooler. At the time of the invention it would have been obvious to control or limit the supercharging effect so that it does not result in a power plant output which is greater than the maximum drive loads of the generator. Firstly, the examiner notes that the skill level of one of ordinary skill in the gas turbine power plant art is high. Often requiring masters or doctoral degrees. Secondly, as noted above when originally designing the power plant care must be taken to correctly match the gas turbine power output to the required load for the generator. Therefore, when retrofitting such a system it would have been obvious to a skilled artisan to note those design conditions as the already set forth maximums and to control the supercharging which is done at off design conditions so that these maximum power outputs are not exceeded. Thus resulting in a system which not only meets the power demands over a greater range of operating conditions but also prevents any damage to the driven device. The examiner also gives official notice that it is well known to control supercharger pressure by controlling fan speed and to control evaporative cooling power increases by controlling the cooling system. Thus it would have been obvious to a skilled artisan to control either of these

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/15821

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 11

systems in order to control the power output of the gas turbine.

Claims 1-5, 8, 11-13, 15-17, 19-30, 32, 33, 34, 36-38, 40-42, 44, 48, 49, 60, 62-73 and 75 lack an inventive step under PCT Article 33(3) as being obvious over FOSTER-PEGG.

FOSTER-PEGG discloses a supercharger for a gas turbine power plant having an evaporative cooler. It is commonly understood that when designing a power plant the gas turbine power output must be matched to the required load needed to drive a generator. FOSTER-PEGG does not disclose that a controller is used which limits the supercharger output so that power plant output does not exceed its maximum unsupercharged design output. Nor does FOSTER-PEGG disclose that the power is specifically controlled by regulating either the supercharger speed or the evaporative cooler. At the time of the invention it would have been obvious to control or limit the supercharging effect so that it does not result in a power plant output which is greater than the maximum drive loads of the generator. Firstly, the examiner notes that the skill level of one of ordinary skill in the gas turbine power plant art is high. Often requiring masters or doctoral degrees. Secondly, as noted above when originally designing the power plant care must be taken to correctly match the gas turbine power output to the required load for the generator. Therefore, when retrofitting such a system it would have been obvious to a skilled artisan to note those design conditions as the already set forth maximums and to control the supercharging which is done at off design conditions so that these maximum power outputs are not exceeded. Thus resulting in a system which not only meets the power demands over a greater range of operating conditions but also prevents any damage to the driven device. The examiner also gives official notice that it is well known to control supercharger pressure by controlling fan speed and to control evaporative cooling power increases by controlling the cooling system. Thus it would have been obvious to a skilled artisan to control either of these systems in order to control the power output of the gas turbine. It also would have been obvious to a skilled artisan to use plural of the supercharging fans in various arrangements in order to multiply the supercharging effect.

Claims 6, 7, 10, 18, 31, 35, 43, 50-59, 61 and 74 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a gas turbine power plant having a supercharged and a controller wherein the system comprises two or more superchargers pressurizing a plenum from which the gas turbine draws its airstream, the plenum having a bypass damper, or wherein there is a cooler and a secondary airstream is drawn from the gas turbine input airstream and passed back through the cooler to enhance cooling performance of the cooler. Further the prior art does not teach of a duct for conveying a high-pressure fluid, the duct comprising an interior conduit within an exterior conduit, the interior conduit having a polygonal cross-section and the exterior conduit having an arcuate cross-section, the conduits defining a space there between and the interior conduit having a flow passage in a wall thereof to provide fluid communication and equalize pressure between the interior of the interior conduit and the space.

----- NEW CITATIONS -----

NONE